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7 November 1980

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 69

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FRANCE READY TO INVEST IN AUSTRALIAN URANIUM

French Minister's Remarks

Melbourne THE AGE in English 11 Sep 80 p 18

[Text]

A senior French Minister said in Sydney yesterday the amount of money his country was prepared to invest in Australian resources had no limit.

The Minister for Industry, Mines and Energy, Mr Andre Giraud, said France was a potential consumer of Australian materials, an investor in this country and an owner of technology Australia could use.

Mr Giraud and a 10-man team of industrialists are in Australia as the guests of the Federal Government for talks with industrialists and Government represenatives.

He indicated France was interested in Australian uranium but would not be worried if Australia did not want to sell.

"In 1990 we will need approximately 10,000 tonnes of uranium per year, which means that purchasing one or two thousand tonnes from Australia is very easy to consider," Mr Giraud said.

"This depends of course on what will be the Australian policy on exports.

"We know Australia is studying the possibility of grading its uranium. This is a business we know. We have a technology which is well-adapted to the Australian problem.

"If Australia is interested, the French Government would facilitate the technology transfer in order to allow the possibility of building such a plant.

"And I know that a French company at least could be interested in taking part in the investment if it appears an economical project."

Mr Giraud said the uranium enrichment issue had been raised in separate talks in the past few days with Queensland Mines and Energy Minister, Mr Vic Sullivan, and New South Wales Energy Minister, Mr Pat Hills. However, there had been no negotiation.

On investment, he said: "I think the limitation will not come from money. Maybe I'll talk differently in a few years but right now the problems are not lying in the question of money.

"It takes time to find partners, get acquainted with the country, evaluate the possibilities, do the necessary formalities — those are the limiting factors at the moment."

Mr Giraud said France was interested in buying more Australian steaming coal if the price was right.

"Australia is not exactly around the corner from France and there is a problem of transporation and loading of coal and the cost of it might be a drawback," he said.

"So that is one of the problems we're discussing during our trip. That's why we were in Newcastle yesterday — to see what can be done to modernise the loading and transporation of coal."

Mr Giraud said, France aimed to have 30 per cent of its energy needs filled by coal by 1990. Oil and uranium would each supply 30 per cent, with the remaining 10 per cent being filled by renewable energy sources.

Australian Controls Rejected

Melbourne THE AGE in English 12 Sep 80 p 15

[Text] France has refused Australia the right to impose controls on any uranium which is reprocessed from supplies contained in Australia. But it has agreed not to use any Australian uranium for weapons purposes.

A joint statement from the Deputy Prime Minister, Mr Anthony, and the French Minister for Industry, Mr Giraud, said last night that officials of the two countries had agreed on a draft nuclear transfers agreement.

The Australian policy requires that Australian uranium will not be used for military or explosive purposes. But it is believed that the French have said they can give no assurances on the reprocessing of Australian uranium until Australia signs a nuclear safeguards agreement with Euraton, the European Commission's nuclear control agency.

CSO: 5100

FRENCH NUCLEAR COOPERATION WITH IRAQ DISCUSSED

JN251412 Baghdad INA in Arabic 1300 GMT 25 Oct 80

[Text] Tunis, 25 Oct (INA)--French Prime Minister Raymond Barre has strongly denounced the campaigns launched by certain circles against Iraqi-French nuclear cooperation.

Replying to a question put by an INA correspondent in Tunis, Barre said that France will continue that cooperation. He said that such campaigns will not make France reconsider its nuclear cooperation with Iraq.

The French prime minister added: French-Iraqi relations are (?enlightened), as well as extremely good and solid. He said that France is putting forth every possible effort to further strengthen these relations in all fields. He announced that France will respond to Iraq's demands, as defined by President Saddam Husayn.

He further said: Our bilateral nuclear cooperation is of a peaceful nature. Iraq and France must ignore all campaigns that try to undermine this cooperation.

Raymond Barre, who is currently visiting Tunisia, was speaking at a press conference he held here today in the presence of Tunisian Prime Minister Mohamed Mzali and some government members.

Replying to a question on Gulf security, Raymond Barre said that France wishes to see security and peace reign over this region. He expressed the hope that the Iraqi-Iranian conflict will end as soon as possible. He said that France believes in the principle of freedom of navigation in the Strait of Hormuz and that it has no special ambitions in the region.

In regard to Arab-French cooperation, he said that France strongly adheres to the principle of cooperation with the Arab countries and that this cannot be linked to internal political conditions in France, such as the presidential elections, because this cooperation is firmly established and under no circumstances would France renege on it.

CSO: 5100

BRIEFS

RADIOACTIVE CLOUD ATTRIBUTED TO TEST--And one more item of home news: Yesterday a radioactive cloud created by the nuclear explosion in the atmosphere carried out in China on 16 October passed over Poland. Specialists of the Central Radiological Protection Laboratory in Warsaw, using military planes equipped with research apparatus, ascertained that at an altitude of 15 km, the cloud was strongly radioactive; but at an altitude of 8 km the radioactivity dropped sharply. No changes in the natural (?composition) of the [word indistinct] were noted in the (?earth's) air. The passage of the cloud over Poland will not cause any (?everyday) health (?hazards). [Text] [LD261038 Warsaw Domestic Service in Polish 0200 GMT 26 Oct 80]

CSO: 5100

PACIFIC NATIONS REACT TO JAPANESE DUMPING PLAN

Australian Official, Scientists

Canberra THE WEEKEND AUSTRALIAN in English 8 Sep 80 p 1

[Article by Andrew Fowler and Alan Goodall: "Japan Ignores Protests From Pacific Nations"]

[Text] JAPAN is to go ahead with plans to dump 10,000 drums of nuclear waste in the Pacific Ocean despite protests by Pacific nations and a cautious, non-committal approach by Australia.

The decision defies a belief by United States scientists that the drums will leak. The Japanese Government's science and technology agency claims the drums will be leak-proof because the 5000 tonnes of radioactive residue will be solidified in cement.

An Australian foreign affairs spokesman said in Canberra last night it was possible that one of the Pacific countries would raise the issue at the Commonwealth Heads of Government Regional Meeting in New Delhi.

He said Australia did not intend doing so itself but was waiting to hear the views of other governments concerned, which had earlier indicated that during the meeting they intended to condemn the Japanese action.

The area where the dumping is to take place – 900km north of the Mariana Islands – has been described by Australian experts as being in one of the most active earthquake belts in the north-west Pacific.

Sydney University's professor in geology, Professor Gordon Packham, and senior lecturer in geophysics, Mr David Falvey, say the dump would violate practically all the criteria recommended by US scientists who have examined the plan's feasibility.

The scientists said dumping areas should be:

- **REMOTE** from earthquakes, volcanoes and continental land masses.
- **IN DEEP** water near the centre of large ocean current circulation patterns with sluggish bottom water movement and an adequate and consistent sediment cover.

DELEGATION

The Mariana Trench is on the eastern side of one of the most active earthquake belts in the north-west Pacific, according to Professor Packham and Mr Falvey.

"West of the trench is a chain of active volcanoes," they said. "The regional seabed sediment distribution is extremely variable and rock outcrop can be observed in places.

"The trench is nowhere near the centre of a deep ocean circulation system and, indeed, fast bottom currents may occur in such trench systems.

"Whether any part of the sea floor is truly suitable for waste dumping is another issue: one which we feel cannot be resolved with the extent of oceanographic and marine geological data available."

Japanese nuclear scientists visited Papua New Guinea this week to repeat the safety claims they made in Australia last month.

A top-level delegation of Japanese scientists spent two days in Canberra briefing the Federal Government on plans to begin trial dumping of nuclear waste in the Mariana Trench.

A spokesman for the Department of Foreign Affairs said yesterday that Australia did not express approval or disapproval.

The delegation was told that the Government opposed "indiscriminate and uncontrolled" dumping of nuclear waste at sea and that if dumping went ahead it had to be done under the strict international dumping codes.

Australian Energy Minister

Melbourne THE AGE in English 11 Sep 80 p 14

[Text]

CANBERRA. — The Australian Government had neither approved nor disapproved of the proposed dumping of nuclear waste in the Pacific Ocean by Japan, the National Development and Energy Minister, Senator Carrick said yesterday.

A Japanese technical mission which met the Government on 19 August did not ask for approval from Australia, he told the Senate.

"The Government has no rights to approve or reject what the Japanese intend doing," Senator Carrick said in reply to Senator Mason (Australian Democrat). The Japanese mission provided detailed information on the operation and gave certain assurances that the dumping would be carried out under the most stringent measures, he said.

In the Senate on Tuesday Senator Chaney said that Japan would dump its nuclear waste on a trial basis, 900 kilometres south-east of Tokyo and 500 kilometres from the nearest island, a Japanese possession. He said the waste in steel drums encased in concrete would be dropped in 6000 metres of water.

The leader of the Opposition in the Upper House, Senator Wriedt, asked Senator Carrick if the Government had told the Japanese delegation specifically that it opposed the dumping of nuclear waste in the Pacific Ocean.

Senator Carrick said the Government told the Japanese only that the disposal of nuclear waste should be carried out in compliance with the strict guidelines of the "London dumping agreement" and in accordance with the requirements of the OECD nuclear energy agreement. He believed that the Japanese intended to observe these rules.

Japanese Minister's Letter

Canberra THE AUSTRALIAN in English 12 Sep 80 p 8

[Text]

IT IS regrettable that a newspaper of the stature of *The Australian* should print an article containing such manifest inaccuracies as that entitled Go-ahead For Ocean Dumping Of N-Waste *(The Australian*, 8/9 p1).

First, the sub-headline Japan Ignores Protests From Pacific Nations is considered most regrettable in that it implies that Japan has already decided to proceed with plans for the ocean disposal of low-level nuclear waste, without taking into consideration the views of the countries of the Pacific.

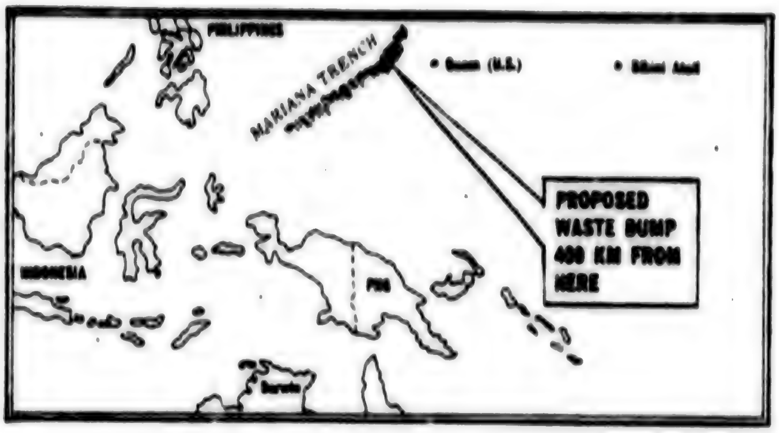
This is not the case. Japan has no intention of proceeding with the plan before making every effort to gain the full understanding of the Pacific nations for the plan.

The recent visit of Japanese specialists to Pacific countries to explain this program was only the first step in such efforts.

The article also quotes Australian experts — Professor G. Packham and Mr D. Falvey of Sydney University — as describing the area where dumping is to take place as "being in one of the most active earthquake belts in the north-west Pacific," the area in question subsequently being identified with the Mariana Trench.

The fact that the Mariana Trench is an active seismic one is indeed well known. This is why the site proposed for experimental disposal of low-level nuclear waste by Japan is actually 400km away from the Mariana Trench in an area of stable geological structures.

The two scientists went on to say that "the dump would violate practically all the criteria recommended by U.S. scientists."



Japan's criteria for the selection of disposal sites are based on the recommendations of the OECD Nuclear Energy Agency and the International Atomic Energy Agency, which are entirely consistent with the criteria recommended by U.S. scientists in relation to water depth, remoteness from continental margins and volcanoes, and location near the centre of large ocean current circulation patterns.

In fact, the Japanese criteria are more detailed in many respects than those of NEA/IAEA, including specific requirements that:

- Seismic zones are to be excluded;
- The sea bottom surface is to be soft and flat;
- Bottom current flow and upwelling must be minimal.

The planned disposal site satisfies all of the abovementioned criteria. Obviously it also satisfies the criteria mentioned in the article which Professor Packham and Mr Falvey suggested it would violate.

T. TAJIMA
Minister
Embassy of Japan

Science Reporter's Analysis

Sydney THE SYDNEY MORNING HERALD in English 13 Sep 80 p 2

[Article by Richard Eckersley: "Unease Over Japan's Nuclear Dumping Plan"]

[Text] Japan is in trouble with its Pacific neighbours over a proposal to do what European nations have been doing for years: dump low-level nuclear wastes in the ocean. Richard Eckersley, science reporter, examines the controversy

The hostile reaction to Japan's plan to dump low level radioactive waste in the Pacific has had its moments of hysteria.

Japan has been accused of "not giving a damn about human life," "dumping deadly material on Australia's doorstep" and "posing a grave threat to the Australian people and the Pacific region, and in particular to the Great Barrier Reef."

But extremist cant apart, the opposition Japan is encountering does reflect increasing international sensitivity over nuclear energy matters.

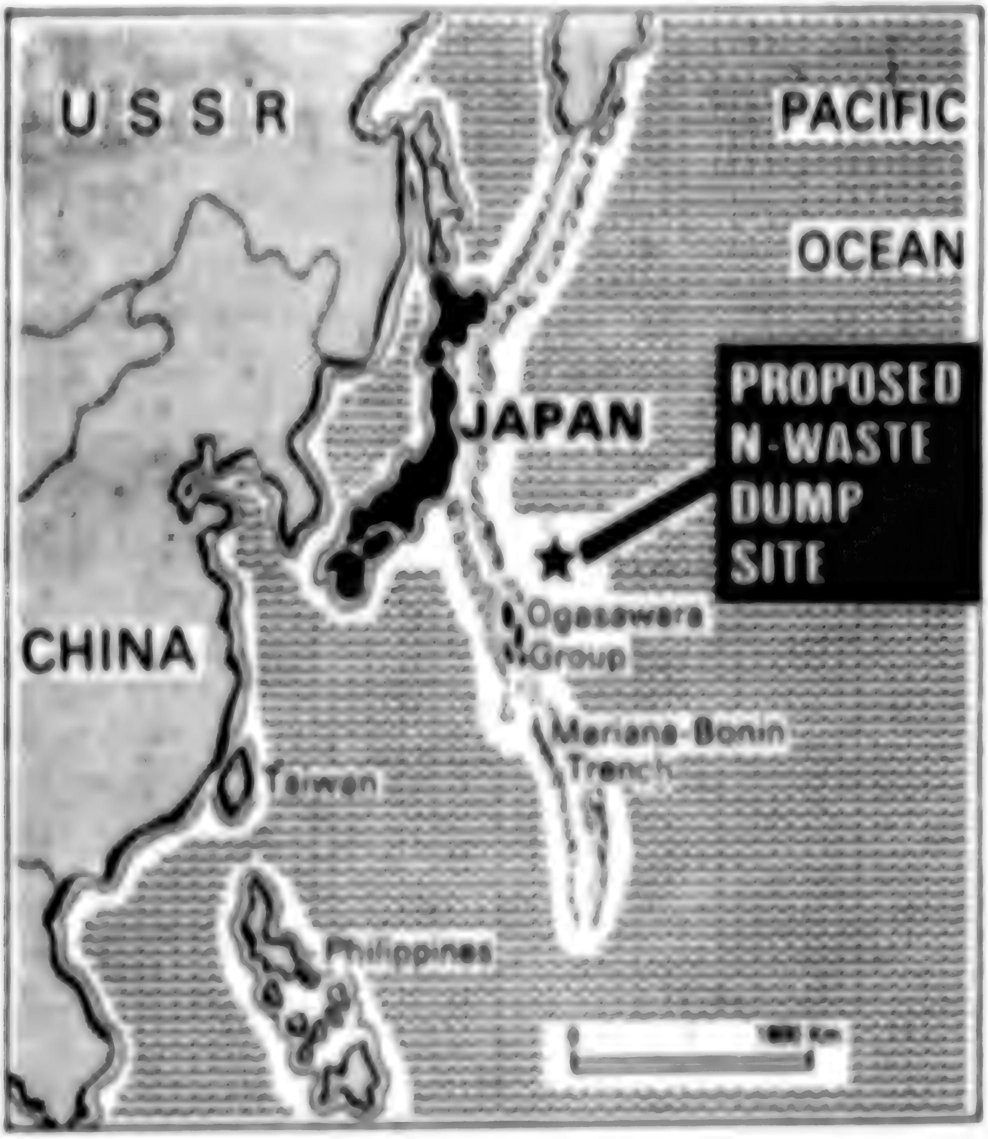
The Japanese have proposed a trial operation next year involving the disposal of 5,000 to 10,000 steel drums of low-level wastes solidified in concrete.

The wastes consist of the general garbage of the nuclear industry — bulky material contaminated with radioactive substances, but not highly radioactive. So-called high-level wastes produced by the nuclear fuel cycle are not involved.

In terms of radioactivity, the disposal trial will involve less than 500 curies. Britain, which with some other European countries has been dumping similar wastes in the North Atlantic for years, will dispose of 108,000 curies this year.

A curie is roughly equivalent to the radioactivity of one gram of radium.

The likely site is in six kilometres of water, 900 kilometres south-east of Tokyo and 500 kilometres from the nearest land--the Japanese-owned Ogasawara group of islands.



It is thousands of kilometres from Australia and other South Pacific nations.

Nevertheless, a Japanese Government team has just completed a tour of South Pacific nations in an attempt to convince them of the safety of Japan's proposal. A team will visit other Pacific nations later this year.

The team's final call was at Port Moresby, where Papua New Guinea's Foreign Minister, Mr Noel Levi, said all countries in the region had openly expressed opposition to the trial operation, and that Japan should abandon its plan.

In Australia the Federal Opposition and the Anti-Nuclear Movement have criticised the Government for not similarly opposing the proposal. The Government says that it was not asked for approval and that it neither approves nor disapproves.

The Japanese team met officials from four Government departments and the Australian Atomic Energy Commission on August 19.

According to a Department of Foreign Affairs spokesman, the Australian officials told the Japanese that "Australia opposes the Pacific region becoming a dumping ground for indiscriminate and uncontrolled disposal of nuclear waste."

The South Pacific Forum had, at its last meeting in July, condemned any action that represented further exploitation of the Pacific for nuclear purposes in ways that disadvantaged the people of the Pacific.

"The officials went on to explain that the disposal of nuclear waste in any environment, in particular the Pacific Ocean, should be undertaken only in compliance with the strictest safety measures and within the guidelines of relevant international agreements," the spokesman said.

These were the Convention for the Prevention of Marine Pollution by Dumping of Waste and Other Matter, commonly called the London Dumping Convention, and guidelines set by the OECD's Nuclear Energy Agency.

The Japanese had assured the officials that the disposal would not begin until Japan had ratified the London Dumping Convention and had the Nuclear Energy's Agency's approval.

(Australia has not yet ratified the convention, although it is a signatory.)

The Japanese agreed to an Australian request "to provide the most detailed information to regional countries and to continue close consultations so that the Pacific States would be kept in the best position to judge any implications which the operations could have for the region."

They said dumping on a permanent basis would depend on monitoring and analysis of the trial operation and development of "an internal consensus in Japan."

They also said the levels of radioactivity would be barely above natural radioactivity levels and would only be a very small fraction of those levels involved in the dumping of wastes by West European countries in the North Atlantic.

Britain has been dumping low-level wastes in the Atlantic since 1949, and some other OECD members have been doing so since 1967.

However, a UK Royal Commission on Environmental Pollution was cautious about assessing the future of the practice, noting "the increasing concern of some member States (of the Nuclear Energy Agency) about the principle of ocean dumping."

The first report of the Ranger Uranium Environmental Inquiry, released in 1976, concluded that it was generally agreed that present methods of ocean disposal "will have to be improved if these are to be a satisfactory long-term solution."

Among Academics, the Arguments Go On

The Japanese Government believes most opposition to its plan to dump nuclear wastes in the Pacific is based on misunderstanding.

According to a spokesman from the Japanese Embassy in Canberra, it is confident that eventually the plan will be accepted and implemented.

That there have been misconceptions about the proposal is undoubted.

Associate professor Gordon Packham, of Sydney University's department of geology and geophysics, alleged, on the basis of an incorrect news report, that Japan was planning to dump the waste in the Mariana-Bonin Trench, the world's deepest submarine depression.

He said this would violate practically all the criteria for ocean dumping recommended by United States investigators: that the site should be remote from earthquakes, volcanos and continental land masses, be in deep water near the centre of large ocean current circulation patterns with sluggish bottom water movement, and have an adequate and consistent sediment cover.

He later agreed that the specified site was well away from the trench and met most of the criteria, although he said he did not know about the bottom currents.

But he and others argue that other questions remain to be answered satisfactorily.

They also say the trial operation could represent "the thin end of the wedge."

Associate professor Richard Temple, of Sydney University's department of physical chemistry, said: "We're always told how innocuous the things are, but no one wants to keep them in their own country. They always want to put the waste on someone else's doorstep."

Professor Charles Kerr, professor of preventive and social medicine at Sydney University, and a commissioner on the Ranger Inquiry, said it could be argued that the seabed was a good place for very low-level wastes such as contaminated refuse from research laboratories.

But recent evidence that containers had breached and that ocean currents were trickier than previously thought indicated the technology was not suitable for the more radioactive wastes being dumped.

However, Sir Philip Baxter, the former chairman of the Australian Atomic Energy Commission, said that if the dumping was carried out in deep water in accordance with guidelines, it posed no danger to the ecology or human life.

"Of all nations, the Japanese have the strongest self-interest in not doing anything that would contaminate the ecology," he said. They would be the first to suffer because a major part of their protein intake was from fish.

But Sir Philip does see merit in the concern over the dumping. "It is a good thing that we have a world community that is thoroughly alert to these proposals."

Papua New Guinea Criticism

Sydney THE SYDNEY MORNING HERALD in English 12 Sep 80 p 11

[Article by Paul Byrnes]

[Text]

PORT MORESBY, Thursday. — The Japanese Government should abandon its plans to dump low-level radioactive waste in the Northern Pacific, the Foreign Minister, Mr Noel Levi, said today.

Mr Levi was speaking after a group of Japanese nuclear scientists briefed PNG officials on Japan's plans to begin experimental waste dumping next year.

Mr Levi said all countries in the region had openly expressed opposition to the waste tests.

At a press conference early today one of the Japanese officials said the waste would be dumped in steel barrels in the high seas in a stable area of the north-west Pacific to a depth of about 6,000 metres.

The closest inhabited islands to the area were all Japanese territory and the currents moved toward Japan, said Mr M. Homma, a senior official with the Japanese Nuclear Safety Bureau.

In Sydney, the Sydney branch executive of the Waterside Workers Association has condemned the Japanese plan.

CSO: 5100

BRIEFS

AGREEMENT ON URANIUM ORE RESOURCES--Tokyo, 27 Oct (KYODO)--Japan and Indonesia have reached tentative agreement on joint exploration and development of Uranium ore resources in southern Sumatra, the NIHON KEIZAI SHIMBUN reported Monday. Quoting government sources, the leading economic daily said formal agreement is expected to be reached when Rokusuke Tanaka, minister of international trade and industry, visits Indonesia on November 4. Japan, now dependent heavily on the U.S. and European countries for supply of uranium, hopes to diversify its supply sources. Sources said the survey is to be undertaken jointly by Japan's Power Reactor and Nuclear Fuel Development Corp, the Metal Mining Agency of Japan, and Indonesia's National Atomic Energy Agency over three years. The survey cost is estimated at yen 600 million, with equipment and knowhow coming from Japan, according to the report. [Text] [OW270145 Tokyo KYODO in English 0138 GMT 27 Oct 80]

CSO: 5100

CANADIAN-OWNED URANIUM DEPOSITS CHANGE HANDS

Canberra THE FINANCIAL AUSTRALIAN in English 15 Sep 80 p 1

[Article by Des Keegan and Ian Perkin: "Koongara Deal: Controversial Swap Lifts Industry Hopes"]

[Text] CANADA'S Denison Mines Ltd has won Federal Government permission to buy the Koongarra uranium deposits from Canadian-owned Noranda Australia Ltd.

The approval, announced yesterday by the Federal Treasurer, Mr Howard, is a further major boost for the Australian uranium mining industry.

Mr Howard had prohibited the Denison proposal in June and ordered a 90-day freeze on the takeover to study the matter.

But after the study by the Foreign Investment Review Board he said yesterday that Denison would be allowed to proceed subject to certain conditions.

The Koongarra deposit is in the Northern Territory, about 50km south of Pancontinental's Jabiluka find which in turn is about 200km east of Darwin.

At last reports it was estimated to contain some 3 million tonnes of ore reserves at an average grade of around 0.3 per cent uranium. This would yield around 12,000 tonnes of uranium oxide over the mine's life.

The go-ahead for the acquisition of the mine by Denison is the latest in a series of developments which have helped lift prospects for the Australian uranium industry.

Most notably these include the imminent float of Energy Resources of Australia Ltd to develop the Ranger deposit 230km east of Darwin and several new contracts for the sale of Australian uranium.

ERA has itself arranged contracts for the sale of $800 million of uranium oxide to its German and Japanese shareholders.

Ownership of the company will spread between Peko-Wallsend Ltd, EZ Industries Ltd, the Japanese and German utilities and the Australian public.

Queensland Mines Ltd also recently negotiated the sale of $90 million in Australian uranium to Finnish power utilities.

The Denison acquisition of Koongarra could also lift the mine's chances of getting off the ground soon. Noranda Australia had spent a number of years trying to win approval for the project.

Most crucial is the need to get substantial Australian equity in the proposed mine to abide by Federal Government's ownership guidelines.

However, these do not apply in the case of switching ownership of a prospect like Koongarra from one foreign hand to another.

Mr Howard said yesterday

the Koongarra project was at the pre-development stage and stressed that government equity and control guidelines did not apply to uranium projects before actual launch.

He said Denison had been engaged in the mining, production and marketing of uranium since 1957.

Its entry into the Koongarra venture would provide economic benefits and would enhance the prospects.

Mr Howard said the conditions behind the takeover included an unequivocal undertaking by Denison to comply with the normal rules later.

That would include complying with the foreign investment guidelines in relation to Australian participation and control in the Koongarra venture at the development stage.

Before developing the deposits, Denison would be required to seek development approval under the terms of the foreign investment policy relating to new uranium projects.

At that stage Denison would have to submit to FIRB a deal acceptable to the Government and be able to get 75 per cent Australian equity.

The deal would also have to include Australian control when the project went into production.

Mr Howard said that where the deal could not get 75 per cent Australian equity, the policy would provide for a lower level.

The lower level would still have to be at least 50 per cent.

With lower equity it would also have to be proved the project was of significant benefit to Australia.

Further, the Australian participants would need to have the major role in determining the policy of the project.

Among the matters to be discussed further are environmental factors and Aboriginal land rights.

While this is merely a swap of ownership between two Canadian companies, with no change to the element of foreign control, the Government will probably come in for criticism in Parliament this week.

With the House of Representatives scheduled to rise for the October election on Friday, the anti-uranium lobby in the Opposition will use the Denison purchase as an excuse to dust off their hobby horses.

CSO: 5100

AUSTRALIA

ACTU REPORTED HOPING TO THWART RANGER PROJECT

Sydney THE SYDNEY MORNING HERALD in English 9 Sep 80 p 13

[Article by Peter Kennedy: "Ranger: Dolan Still Hoping"]

[Text] **The senior vice-president of the ACTU, Mr Cliff Dolan, has not given up hope that opposition from rank-and-file unionists might prevent the Ranger uranium project in the Northern Territory from getting off the ground.**

But he admitted in Sydney yesterday that the ACTU had mis-timed its anti-uranium drive aimed at unionists.

Mr Dolan was speaking after visiting uranium sites in the NT last week with the junior vice-president of the ACTU, Mr Jim Roulston, and an assistant secretary, Mr Bill Kelty.

"I am prepared to admit that we have lost a lot of time," he said. "We should have been doing the education job 12 months ago that we are trying to do now.

"But Ranger is not yet operational. I believe that further development could still be stopped if we could carry out this education role on people who are contemplating going there to work.

"Both the mining and processing sites for the Ranger operations are still in a very early stage of development."

Mr Dolan, who is the leading advocate of the ACTU's anti-uranium policy, is almost certain to be elected unopposed as president next month, to succeed Mr Bob Hawke. Mr Hawkes's resignation from the position to contest the next federal election takes effect on September 30.

Mr Dolan said that a lot of fabrication work for the new uranium sites was being done on the eastern seaboard.

It may be more realistic to aim the education campaign at workers employed by firms doing this work, rather than attempting to block the mining, processing and transport of the material with bans, he said.

He and the other ACTU officials had spoken to about 1,200 people at three sites — Jabiru, which is the site for the Ranger project, Ja Ja (Pancontinental) and Nabarlek (Queensland Mines).

"They got the message that we did not believe they should be working in the industry," he said, "but the general reaction stressed the employment question.

"We had to agree that it is creating some jobs in the present difficult employment situation. But the problem of unemployment is not going to be solved by uranium mining."

He conceded that lack of unity among affiliated unions in supporting the ACTU's policy had been a serious problem.

Even last month's decision by Darwin waterside workers to ban the export of yellowcake had gone against the policy of the Waterside Workers' Federation to only impose bans in support of other unions involved in production and transport.

CSO: 5100

AUSTRALIA

BRIEFS

RANGER RETURN FINAL--The Federal Government and the Ranger partners, Peko-Wallsend and EZ Industries, yesterday completed the transfer of the Government's stake in the Ranger Uranium project back into private hands. The Government accepted a $125 million bid from a consortium led by Peko for its 50 percent Ranger stake late last year. After signing the agreement, the Minister for Trade and Resources, Mr J.D. Anthony, confirmed that agreements already signed for the sale of uranium from Ranger were worth $2000 million at current prices. "I believe this figure could be considerably larger over the 15 years' life of the contracts," he said. He said the contracts were among the largest ever signed by one company for one product. [Text] [Canberra THE AUSTRALIAN in English 13 Sep 80 p 29]

NUCLEAR POWER SUPPORTED--Darwin--The former chairman of the Northern Land Council, Galarrwuy Yunupingu, voiced strong support yesterday for the nuclear power industry. He issued a statement in Darwin following a week-long visit to Japan at the invitation of the Kyushi electric power company, which has interests in the Nabarlek uranium deposit in Arnhem Land. The mine is on Aboriginal land, as is the Ranger mine now being developed within the boundaries of the Kakadu National Park. "I have got a completely different understanding of how important nuclear power is to places like Japan," he said. He inspected Japanese nuclear power plants, and said he was impressed by the level of safety. Mr Yunupingu lost his job as chairman of the Northern Land Council at elections in Darwin last month, but he has been retained by the council as a consultant. [Text] [Sydney THE SYDNEY MORNING HERALD in English 16 Sep 80 p 10]

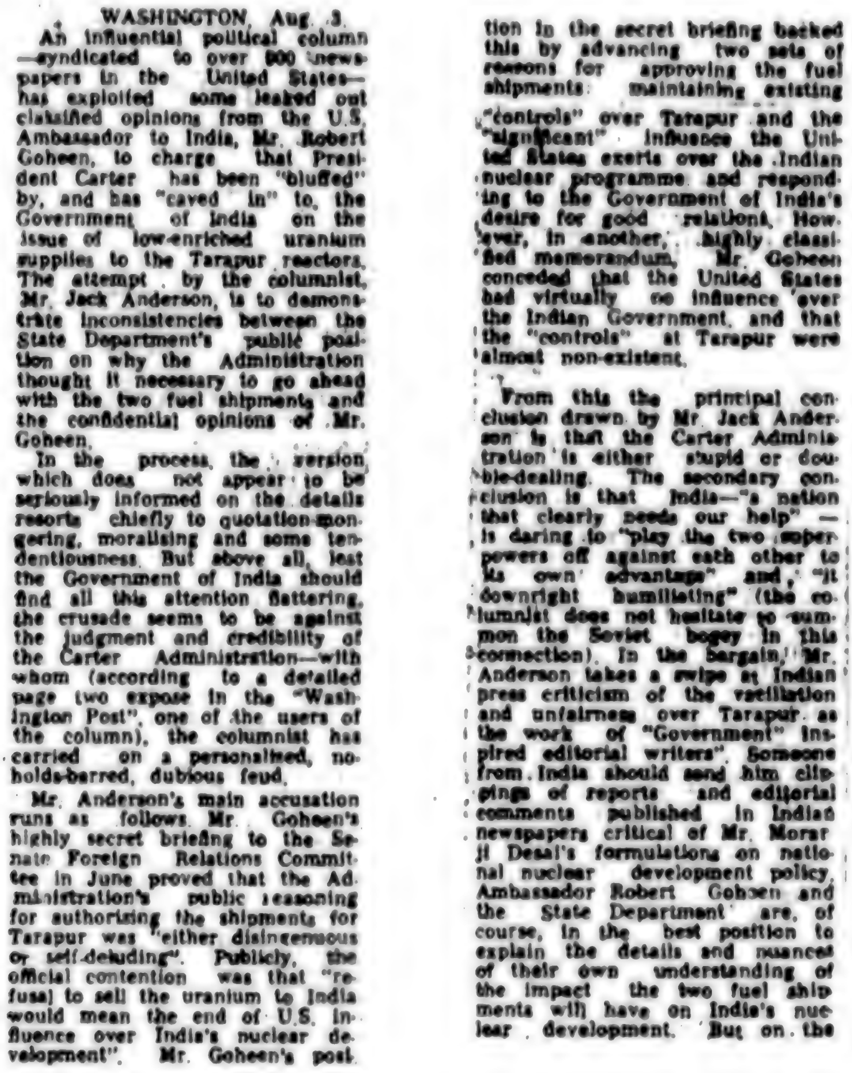
CSO: 5100

CORRESPONDENT NOTES ANDERSON STORY ON TARAPUR FUEL

Madras THE HINDU in English 4 Aug 80 p 5

[Article by N. Ram: "Campaign To Block Tarapur Fuel Based on Goheen's 'Disclosures'"]

[Text]



WASHINGTON, Aug. 3.

An influential political column—syndicated to over 900 newspapers in the United States—has exploited some leaked out classified opinions from the U.S. Ambassador to India, Mr. Robert Goheen, to charge that President Carter has been "bluffed" by, and has "caved in" to, the Government of India on the issue of low-enriched uranium supplies to the Tarapur reactors. The attempt by the columnist, Mr. Jack Anderson, is to demonstrate inconsistencies between the State Department's public position on why the Administration thought it necessary to go ahead with the two fuel shipments and the confidential opinions of Mr. Goheen.

In the process, the version which does not appear to be seriously informed on the details resorts chiefly to quotation-mongering, moralising and some tendentiousness. But above all, lest the Government of India should find all this attention flattering, the crusade seems to be against the judgment and credibility of the Carter Administration—with whom (according to a detailed page two expose in the "Washington Post", one of the users of the column), the columnist has carried on a personalised, no-holds-barred, dubious feud.

Mr. Anderson's main accusation runs as follows. Mr. Goheen's highly secret briefing to the Senate Foreign Relations Committee in June proved that the Administration's public reasoning for authorising the shipments for Tarapur was "either disingenuous or self-deluding". Publicly, the official contention was that "refusal to sell the uranium to India would mean the end of U.S. influence over India's nuclear development". Mr. Goheen's position in the secret briefing backed this by advancing two sets of reasons for approving the fuel shipments: maintaining existing "controls" over Tarapur and the "significant" influence the United States exerts over the Indian nuclear programme and responding to the Government of India's desire for good relations. However, in another, highly classified memorandum, Mr. Goheen conceded that the United States had virtually no influence over the Indian Government, and that the "controls" at Tarapur were almost non-existent.

From this the principal conclusion drawn by Mr. Jack Anderson is that the Carter Administration is either stupid or double-dealing. The secondary conclusion is that India—"a nation that clearly needs our help"—is daring to "play the two superpowers off against each other to its own advantage" and, "it downright humiliating" (the columnist does not hesitate to summon the Soviet bogey in this connection). In the bargain, Mr. Anderson takes a swipe at Indian press criticism of the vacillation and unfairness over Tarapur as the work of "Government" inspired editorial writers". Someone from India should send him clippings of reports and editorial comments published in Indian newspapers critical of Mr. Morarji Desai's formulations on national nuclear development policy. Ambassador Robert Goheen and the State Department are, of course, in the best position to explain the details and nuances of their own understanding of the impact the two fuel shipments will have on India's nuclear development. But on the vital point," the columnist certainly appears to be off the mark while playing with words.

According to Mr. Jack Anderson, the public argument made by the Administration was that refusal to make the two fuel shipments "would mean the end of US influence over India's nuclear development." Those who were present at the Tarapur hearings and saw the relevant documents will appreciate that the reasoning of the State Department was a good deal more complicated, and more sophisticated, than this. In particular, the Deputy Secretary of State, Mr. Warren Christopher, and the nuclear non-proliferation specialist, Ambassador-at-large Gerard Smith, advanced a complex of policy and technical grounds for justifying the shipments—but left no doubt that by refusal the United States would be in an even less advantageous position than it was at present to intercede with India on the issue of its nuclear development within the non-proliferation context. In particular, Ambassador Smith left no illusion about the United States being in a position to "control" anything concerning the nuclear development of India as an independent country with not inconsiderable technological capability. And both Messrs. Christopher and Smith made it clear that on the specific implementation of the Tarapur part of the 1963 agreement on nuclear cooperation, the United States had no complaints.

If the U.S. Ambassador to India stated confidentially that India actually undermined the Tarapur "controls" or rather the specific safeguards put in place by the United States as part of the agreement, it is for him to clarify his position. But there is nothing in the columnist's evidence—beyond insinuation and an oblique quote—to show that Mr. Goheen did indeed make this charge or acknowledgement.

Mr. Jack Anderson is a respected political columnist, a muckraker with a reputation for strategic contacts within the Administration and Congress, for "liberalism" and independence. In the past, he has performed such services to the truth as exposing Mr. Henry Kissinger's manoeuvres relating to the sub-continent, taking an honest look into the character of the Indian emergency and unravelling a little of the unsavoury U.S. relationship with the military tyrant of Pakistan. However, in recent skirmishes with the Carter administration, some of his "facts" have been shown up to be tendentious and at least one document concocted—or rather "reconstructed," as the columnist put it.

The story on Tarapur is clearly the result of a motivated and carefully timed leak by a clique of Congressional aides known to be fanatically committed to "non-proliferation" who consider India's example as the "world's first nuclear violator" as infectious (especially in the Islamic world), but who have been naturally silent on Israel's by-no-means coy nuclear development in collusion with the United States.

CSO: 4220

INDIA

DAE OFFICIAL DISCUSSES NUCLEAR POWER NEEDS

Calcutta THE STATESMAN in English 30 Aug 80, supp, pp 1, 2

[Article by Dr M. R. Srinivasan, Director, Power Projects Engineering Division, Department of Atomic Energy, Bombay]

[Text] Apart from being an instrument for improving the quality of life, energy is a basic input to the national economy both agricultural and industrial. Provision of adequate quantities and kinds of energy is and will continue to be a challenge to both the Central and State Governments and other institutions engaged in various specific tasks relating to energy supply and transport. We cannot ignore the nuclear option in providing energy to our economy except at the cost of subjecting the economy to even greater stresses and strains.

Although some 40 per cent of the total energy consumed in the country at present still comes from firewood, cowdung and agricultural waste, the primary commercial energy inputs to the Indian economy are from coal, oil, hydroelectricity and, to a limited extent, nuclear electricity. In percentage terms, the share of coal has been going down over the last three decades while that of oil and electricity has shown an increase during the same period.

The Working Group on Energy Policy in its report submitted in November 1979 has concluded that by 2000 the coal requirement would increase to 472 million tonnes, oil to 92 million tonnes and electricity (including generation by use of coal and oil) to 550 TWh (one Terrawatt hour = one thousand million kilowatt hours) under what has been termed as a 'Reference Level Forecast' (RLF). In arriving at this RLF, the annual average growth rate of the GDP has been assumed to be 4.7 per cent from 1977-78 to 1982-83, 5.5 per cent from 1982-33 to 1987-88 and 6 per cent from 1987-88 to 2000-2001. The Group feels that with a package of policies which include, inter alia, curbing oil consumption, improved energy utilization, reduced energy consumption in industries increased reliance on renewable energy sources and choice of development strategies linked to minimizing energy usage, the annual requirements by 2000 could be reduced to 426 million tonnes of coal, 69 million tonnes of oil and 464 TWh of electricity, while maintaining the GDP growth mentioned above.

Reaching a coal production target of 400-500 million tonnes per annum by 2000 is considered difficult, particularly in the context of the current difficulties in reaching a target of 120 million tonnes. Assuming that half of this quantity is used in power stations located, say at an average of 800 km from the coal mines (the distance beyond which nuclear power stations are considered economical), the traffic generated is about 64 billion tonne kilometres, which constitutes some 16 per cent of all railway goods traffic visualized for 2000. In other words, coal movement, which has already posed a major problem, will have to be stepped up with adequate investments in the railway system and extensive adoption of box cars and quick loading and unloading facilities.

The oil situation naturally raises some important issues. Even if the consumption of oil by 2000 were held down to 69 million tonnes per annum, the country has to import 45 million tonnes because the internal production is likely to peak at about 24 million tonnes. This will mean a foreign exchange of about Rs 16,500 crores at $30 per barrel and about 28,000 crores at $50 per barrel. In spite of the sharp increase in oil prices, the growth of demand for oil products in 1979-80 is around 9-10 per cent. In contrast the optimum level forecast assumes that in the period 1982-2000, the demand for oil products would grow only at the rate of 4 per cent per annum. Time only will tell whether demand can be contained to such a low growth rate but what is clear is that there is an urgent need to shift an increasing share of transport to the rail system which should switch over to electrification of the main trunk line (especially linking the four major centres of Bombay, Calcutta, Delhi and Madras). Furthermore there is a need to introduce electric trolley buses (once used in Bombay on a trial basis) in many of our cities. The scope for partial substitution with alcohol exists but given the adverse land-man ratio and pressure on agricultural resources for feeding a large population and livestock, a major reduction on this account should not be expected. Liquid fuel from coal is also an available option but here again the contribution is likely to be small due to economic factors. Hydrogen as a replacement to oil in the transport sector is feasible but it must be borne in mind that energy in the form of electricity or coal is required to produce hydrogen (in fact there is a net consumption of energy in the process). However, all these options must be pursued.

Solar Energy

In the last few years, there has been considerable interest in bio-gas, biomass, solar, wind, geothermal and tidal sources of energy. The last two are very limited in our country, at least as known hitherto. Though there is considerable enthusiasm over solar, electric devices--whether using a thermal engine or photo- [rest of word illegible] device--are very expensive. I recently reviewed the work of the 10-KW solar electric generator set up jointly by BHEL and IIT, Madras. This was done on an experimental basis and has cost about Rs 50 lakhs. It would be wrong to extrapolate from such an experience. However, assuming that a 10-KW system costs only Rs 10 lakhs (which is optimistic) and the system produced about 3000 Kwh per KW installed, at the 15 per cent of capital cost (to cover interest, depreciation, return on capital and salaries), the cost per Kwh will be about Rs 5. Another significant fact is the rather complex nature of the plant; though not like a nuclear plant it was certainly not as simple as it is often made out to be. Cost figures are not readily available for the photo-voltaic devices but current costs per Kwh may be about Rs 5. These are no doubt areas for research and development and one hopes that significant breakthrough will be made. Low grade heat from solar collectors should be economic in a number of process industries even at present.

Biogas certainly deserves to be pushed through: in this instance, technology is available and it is a case of dissemination and extensive application. So far as biomass is concerned, even now a significant part of rural domestic energy is from firewood. Cultivation of quick growing species on all available land is a good policy to sustain this supply of firewood. Wind energy can be used in certain local applications. The decentralized energy systems would have particular relevance to the remote communities, of which we have a significant number. A conclusion that does emerge however, is that in the near term i.e. in the next 20 years or so we shall continue to depend on coal, oil, hydro and nuclear, apart from firewood, dung and agricultural waste in the rural areas and in a limited way on solar energy.

Nuclear Power

So far as nuclear power is concerned, the country wisely made an early entry. Tarapur has completed ten years of service attaining an average capacity factor of 54 per cent for the entire period and has made a useful contribution to Maharashtra and Gujarat. The design of Tarapur reactors is such that they require to be taken off the line every year for about three months for refuelling. Even so the capacity factor has been around 60 per cent and lately there is a tendency for a reduction to around 50 per cent. This is largely attributable to reduction in the maximum operating power level due to uncertainties in supply of fuel and the need to stretch out the available fuel. Efforts are on to find an alternative solution to keep the Tarapur reactors going even if the fuel supply from the USA is discontinued. The Rajasthan Atomic Power Station's Unit-1 has, after some initial problems, settled down to reliable operation. During 1979, it registered a capacity factor of 63.6 per cent.

An analysis has been made of the total period of time when the Tarapur units have been on bars for more than 30 days continuously. It turns out that for Unit-1 of TAPS, this is 63 per cent of time and for Unit-2, it is 68 per cent. In the case of the RAPS-1, the corresponding value is 30 per cent. The lower figure at RAPS-1 is due to initial problems with the grid and also the learning period required to understand the operational features of a complex system. One may, however, compare this experience with some of our larger thermal sets (100-200 MW range), where a continuous on bar time of 30 days is not often exceeded. Another interesting feature is that during 1979, the two units of TAPS had only one forced outage. These establish the point that we have now reached a stage where we can operate nuclear reactors in a reliable manner as part of our power systems.

Unit-2 of RAPS is expected to be commissioned in 1980-81 and Unit-1 of Madras Atomic Power Project will be ready to start up by second quarter of 1981. Recent developments in international politics have underlined the need for self-reliance in this field. The infrastructure requirements for setting up a self-reliant nuclear industry are quite taxing for a developing country. However, our experience has shown that these problems can be solved and it has been possible to build up a competent infrasturcture and indigenous manufacturing capability. Setting up such a capability in this frontier area of technology has no doubt delayed our immediate programmes. However, it is a one time investment and future projects ought to be amenable to stricter control on schedules. It is a matter of satisfaction that most components needed for three reactors have been produced in India. In the field of nuclear technology free market conditions do not exist and those countries which are in a position to supply these components and equipment may wish not to do so on political grounds. It is therefore necessary that greater emphasis should be laid on self-reliance.

The country is at a crossroad so far as nuclear power development is concerned. Nuclear power and heavy water projects have been considerably delayed and their costs have increased. The uncertainty of fuel supplies from Tarapur is well known, so is the attitude of the countries who supply special materials required for nuclear projects. However, there is the other side of the coin, namely, the operation of three power reactors over a number of years, design and construction of four power reactors, fabrication of nuclear fuel very largely on our own, which is a creditable achievement from any standards. The time does appear to be ripe for a bold initiative in expanding the nuclear power programme. Standardization of designs and repeat ordering of equipment would overcome the manufacturing delays. Adopting multiple unit stations would maximize the utilization of manpower resources and site infrastructure. A commitment to a programme consisting of a number of identical reactor units would enable industrial mobilization and permit more effective planning of shop activities to achieve best results. If such an approach were used, it should be possible to aim at a target of about 10,000 MW by the turn of the century. The package could consist of 10 units of 235 MW, work on which would start in the Sixth Plan. This would be followed by 12 units of 500 MW capacity on which work would be initiated in the subsequent plan period. There would have to be matching investments in production of heavy water, new uranium mines and fuel production. Naturally key industrial inputs, including cement and steel, will have to be made available at the appropriate time. With such a mobilization, the nuclear power programme can make an important contribution to the power needs of the country and even more significantly lay the base for a fast reactor programme and eventually for thorium utilization.

Radiation Fear

There is a good deal of organized opposition to nuclear energy especially in the affluent countries. There can be no doubt that energy consumption in many affluent countries is very wasteful and energy conservation is indeed first in the order of priority. However, when it is remembered that in India the largest fraction of commercial energy and indeed noncommercial energy (for example, animal power and human power) is used in either agriculture or in industry for productive purposes, the scope for conservation is limited and for sustaining greater economic progress, availability of energy of the right kind and in the right quantity is a necessary precondition. The Three Mile Island accident in the USA has no doubt created fear in the public mind. This accident, which is stated to be due to some design deficiency, equipment mal-functioning and operator errors nevertheless did not lead to any fatality. The nuclear industry gives highest priority for health and safety aspects not only for the plant personnel but for the general public as well. At present 226 reactors are operating all over the world and have accumulated about 1800 reactor years of experience. There has not been a single fatal incident nor serious injury due to radiation from a civilian nuclear power plant. Many people are not aware that mankind is continuously exposed to radiation of which 68 per cent comes from the natural background, 31 per cent from medical radiation, 0.6 per cent from fall-out from nuclear tests and only 0.15 per cent from the nuclear power industry.

The atomic energy programme, conceived and nurtured by Jawaharlal Nehru and Homi Bhabha, must be pursued vigorously so that nuclear energy will contribute to our total power resources. The manpower and infrastructural resources that have been created over the last 25 years must be put to maximum use. It is true that initial expectations have not been fulfilled for a variety of reasons but the time is now ripe for us to accelerate the tempo of development in this field.

CSO: 5100

BRIEFS

NUCLEAR ENERGY PROGRAM INCREASED--Islamabad, 18 Oct (AFP)--Pakistan must step up its nuclear power programme and acquire a nuclear reprocessing plant for its uranium, Munir Ahmed Khan, chairman of the Pakistan Atomic Energy Commission, said today. Speaking at a seminar in Lahore, Dr Munir said Pakistan has reached a stage where it must build its own nuclear powerplants for its "expanded nuclear programme." He said it was clear that advanced countries opposed Pakistan obtaining the technology to recycle nuclear fuel and "this situation was not acceptable to Pakistan." Recycled uranium could be used to make atomic bombs. Despite "Western propaganda," Pakistan's nuclear programme would remain peaceful because the country was aware of the dangers of nuclear proliferation, Dr Munir said. The country has been able to manufacture nuclear fuel for its Karachi powerplant and has been decided to make adequate arrangements to fill its fuel needs, he said. Pakistan must also acquire a nuclear reprocessing plant to enrich its own abundant uranium, he said. He deplored leaving unexploited natural resources in developed countries, saying they first wanted to deplete Mideast oil resources. [Text] [OW182257 Hong Kong AFP in English 2245 GMT 18 Oct 80]

CSO: 5100

BRIEFS

FALLOUT REACHES U.S.--San Francisco, 20 Oct, TASS--A giant radioactive cloud formed after a Chinese nuclear weapon test in the atmosphere on 16 October has crossed the Pacific and is hanging over the U.S. West Coast. As a spokesman for the government Environmental Protection Agency reported, this service will conduct a daily check on radioactive contamination of the air aside from the usual check made twice a week. The U.S. population, primarily farmers, has been warned about the possibility of radioactive contamination of the soil and pastures in the event of rainfall along the route of the "Chinese cloud." For 48 hours after the nuclear explosion in China the pilots of aircraft crossing the Pacific were obliged to deviate from their normal routes by considerable distances to avoid contact with the dangerous cloud, which threatened airlines with radioactive contamination and posed a danger to the health of passengers. [Text] [LD270847 Moscow PRAVDA in Russian 21 Oct 80 p 5]

CSO: 5100

SOUTH KOREA

BRIEFS

RADIOACTIVE LEAKAGE--Seoul, 14 Oct--Radioactive leakage due to inadequate insulation has occurred at the storage facility for radioisotope at Seoul National University's College of Engineering, it was learned Monday. The amount of leakage was presumed to be negligible, though a protracted exposure to it may be dangerous, officials at the college said. They said poor storage facility was blamed for the accident. The radioisotope repository was relocated to the present site at southern Seoul when the college was moved from its former site in the eastern part of the capital last January. [Text] [Seoul HAPTONG in English 0121 GMT 14 Oct 80 SK]

CSO: 5100

COBOEN DIRECTOR SEEKS WELL-DEFINED NUCLEAR POLICY

La Paz PRESENCIA in Spanish 13 Aug 80 p 6

[Text] "It is essential that an interministerial commission be formed at the very highest level to plan, study and carry out a national nuclear power policy," the executive director of the Bolivian Nuclear Energy Commission (COBOEN), Capt Edgar Ampuero, told PRESENCIA.

He indicated that the country does not have--and never has had--a policy covering the planning of nuclear power uses in Bolivia.

When asked about the present status of the institution, he replied, "I must confess that I found COBOEN, like all the other state institutions, entirely lacking the financial support required for its needs in connection with programs and projects."

He added that he is reporting fully to the Minister of Mines and Metallurgy on the position of COBOEN, so that the ministry can forward a request to the Finance Minister regarding the need for more attention to the commission's financial demands and to the budgeted monetary flows which have not yet been disbursed.

"From the human standpoint," he noted, "the institution has had no problems because it is a technical body and its staff is engaged in research. However, we are in a process of institutional reorganization aimed at eliminating any political problems."

Interministerial Commission

Later in the interview, the officer emphasized that "The focus of government policy at the present time is to persuade certain executive circles to establish a high-level interministerial commission, with a view to defining a nuclear energy policy for Bolivia, since there is none now."

He also stated that currently, COBOEN has a varied field of action, including geology, mining, metallurgy, reactive ores, nuclear medicine, and pure and applied research. The defining of atomic energy policy will, simultaneously, enable us to establish COBOEN's programs, both from the standpoint of national requirements and needs.

In closing, he said, "What we want is to establish the path COBOEN is to follow over the next 10 years, so that we can direct our attention to its future financial and human resource needs."

7129
CSO: 5100

URANIUM MINE RESERVES ESTIMATED AT 70,000 TONS

La Paz PRESENCIA in Spanish 21 Sep 80 p 1

[Text] Official sources indicate that the uranium ore reserves at the Cotaje mine amount to some 70,000 tons, with an average fineness of 0.516 gram of uranium 308 per ton.

Of these reserves, 40,000 tons are proven and 30,000 tons probable. Proof of the reserves was determined by the open cut method, whereas the probable reserves were assessed by means of "underground research."

The Cotaje mine, belonging to the Bolivian Nuclear Energy Commission (COBOEN), is located in Coroma Canton Quijarro Province, Potosi Department. The ore deposit is technically defined as "an exogenous formation in a volcanic environment."

There are various types of uranium ores there and it is planned to have an average output of 50 tons daily.

Cotaje is the first Bolivian uranium mine to reach the stage of commercial production. Moreover the prospects are for it to be converted into a major source of financing at least for the development of the country's future nuclear energy programs.

Concentration

The uranium ore concentration plant, recently opened at Cotaje, marks the start of commercial use of the product for peaceful purposes.

A complex technical process, adapted by Bolivian experts to conform both to the characteristics of the region and of the ore, ensures the obtaining of concentrations of uranium with a fineness of 60 to 70 percent.

The ore, mined in open cut (surface mining) for the time being, is then stacked in piles of 2,000 tons. There are six of these piles, that is, 12,000 tons of uranium ore in the initial stage of concentration.

The piles are treated with a solution of water, sulfuric acid(reactive) and manganese dioxide (oxidant). From this is obtained a liquid with a high uranium content. It is, in fact, the lixiviation process.

The second stage of uranium recovery consists of a series of impurity elimination procedures, followed by concentration, filtration and drying, until commercial uranium concentrate is obtained in the form of a powder.

Installation of the plant took approximately one year and was handled exclusively by Bolivian technicians and workers.

When it was inaugurated last Thursday, Minister of Mines Carlos Morales Nunez del Prado promised the support of his government for COBOEN's plans in connection with the prospecting and development of uranium deposits.

These plans are to be supplemented by a "subcritical nuclear complex" which is currently being set up at Viacha, capital of Ingavi Province, in La Paz Department.

COBOEN's future programs also include sending national technicians abroad for high level training.

Uranium Concentration. The process of uranium concentration at the Cotaje mine is beginning with the stacking of the ore in huge piles which are subjected to a special physicochemical process.

7129
CSO: 5100

BRIEFS

NUCLEAR PLANT CONSTRUCTION--President Joao Baptista Figueiredo has signed two decrees granting Nuclebras the monopoly over studies, planning and construction of nuclear plants and the authority to create a new subsidiary under the name of Nuclon, Nuclebras Nuclear Plant Construction Enterprise, to be in charge of that monopoly. Nuclebras will hold 51 percent of Nuclon's capital and the remainder can be subscribed by concessionaires authorized to operate electricity-generating nuclear plants. The decrees were justified by "the need to make decisions on a short term basis and because the question is directly related to national security." According to the Planalto Palace spokesman, the decrees will have no effect on the construction of the Angra nuclear plants. [Text] [PY250111 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 24 Oct 80]

URANIUM RESERVES REEVALUATED--After the latest evaluation of the Lagoa Real deposit located in the State of Bahia, estimates of Brazilian uranium reserves have risen by more than 236,000 tons. This report was released today by (Deodoro Jose Paulo Massurnag), chief of the Nuclebras [Brazilian Nuclear Corporation] mineral resources evaluation department, at the third symposium on mineral and energy resources held in Camboriu, Santa Catarina. He explained that more than half of these reserves have been classified as concluded, deduced resources [reservas medidas e indicadas] while 95,000 tons are classified as estimated resources [recursos inferidos]. These reserves represent an increase of 10 percent over the latest estimates carried out last year. These deposits are located in Pocos de Caldas, the planalto area and the quadrilateral of mountains in Minas Gerais State; in Figueiras, Parana State; in Amorinopolis, Campos Belos and Rio Preto, Goias State; in Itatiaia, Ceara State; and in Lagoa Real, Bahia State; and in (Nhenhespinhara), Paraiba State. [Text] [PY240115 Brasilia Domestic Service in Portuguese 2200 GMT 23 Oct 80]

CSO: 5100

BRIEFS

DANGER FROM PRC TEST FALLOUT--The Central American and Caribbean peoples are threatened by a radioactive cloud caused by an atomic explosion recently set off in the atmosphere by the PRC. This information was provided by German scientist (Heinz Kaminski), director of the (Boshun) Laboratory in the FRG. The scientist said that at present the cloud is over the East Coast of the United States at an altitude of from 10,000 to 13,000 meters. (Kaminski) said that if the cloud continues on its present course, it will progressively cover Latin America within 3 to 4 weeks as a result of the influence of high and low pressure zones. Scientific investigations have revealed that the cloud contains highly radioactive particles of strontium 90, cesium 130 and plutonium, a highly carcinogenic metal. However, the scientist said that the cloud could lose a great deal of its toxicity as it progressively crosses the Atlantic and Pacific Oceans. For their part, U.S. authorities have discounted the existence of a threat to the U.S. population. [Text] [PA220130 Panama City Televisora Nacional in Spanish 2315 GMT 21 Oct 80]

CSO: 5100

TIMETABLE OF NUCLEAR ENERGY PROGRAM DISCUSSED

Caracas EL UNIVERSAL in Spanish 29 Sep 80 Sec 1 p 16

[Article by C.R. Chavez]

[Excerpts] Even though Venezuela apparently does not have to be in any rush to build nuclear powerplants to generate heat that will then be converted into electricity, inasmuch as we have wideranging prospects in electrothermics and hydroelectricity, the country has still commissioned a study on the viability of building a nuclear powerplant. The study concluded that in 17 years Venezuela could have a nuclear plant in operation with a generating capacity of 1,200 megawatts, or 1.2 million kilowatts, according to the assertions of the president of Sofratome of France.

Nuclear Powerplant Problems

First of all, choosing the nuclear route entails a very long-term commitment, at least 20, if not 25 or 30, years. From a technical standpoint, the complexity of the facilities, quality control problems, operational security problems and effluents control problems require particular attention and a very high level of training on the part of the people in charge of the design, construction, operation and maintenance of the facilities.

From an economic and financial standpoint, although electricity generated by nuclear power is less expensive than electricity produced by an oil-fired plant, which can be demonstrated, the initial investment is much larger. From a political and social viewpoint, public opinion is very sensitive to anything having to do with nuclear power. On the other hand, the responsibility of nuclear powerplant operators is governed by extremely strict regulations.

There are certain safeguards to prevent nuclear materials from being diverted away from peaceful uses. The UN International Atomic Energy Agency in Vienna is in charge of monitoring the enforcement of the pertinent controls. Agreements have recently been concluded between countries providing technology and those receiving it, as well as between these nations and the UN agency.

Therefore, we will have to provide basic and advanced training to develop highly competent personnel for all of the functions involved in designing, building and running nuclear powerplants, as well as for the monitoring tasks assumed by governmental agencies. The countries beginning their nuclear development must also secure guaranteed supplies of fuel for the entire time that each plant will be used and amortized, in addition to providing for the storage and reprocessing of the spent fuel.

The Why, When and How of a Nuclear Powerplant in Venezuela

We know that Venezuela has an enormous hydroelectric potential. Construction contracts have already been signed or work is already at an advanced stage in connection with harnessing the Guri, Uribante-Caparo, Bocono-Tucupido and Agua Viva waters. The other development projects not as yet under way will generate at least 7,000 megawatts and possibly as much as 10,000 megawatts of operating capacity, as compared to peak requirements of 10,000 megawatts in 1985, 17,000 megawatts in 1995 and 27,000 megawatts in 2000.

Moreover, Venezuela has major oil, natural gas, coal and even bituminous shale resources.

If by government decision natural gas is not used to generate electricity, coal and heavy oil treatment residues could fuel conventional thermal plants.

Thus, it does not seem that nuclear-generated electricity is a priority in meeting the country's needs.

Nevertheless, the International Atomic Energy Agency conducted a study in 1978 to determine the optimum capacity of nuclear powerplants that might be built from 1985 to 2000, as well as the best time to incorporate them into the power network.

The study concluded that a 1,200 megawatt unit could be put on line in 1997 or 1999, depending on hydroelectric development programs.

With regard to a timetable for studies on and the implementation of a nuclear program, the initial studies should begin in 1983-1985.

However, some of the assumptions and raw data for this study have changed since 1978, specifically the price of oil and the investment requirements for both conventional and nuclear plants.

Thus, from now until 1983-1985 we ought to reexamine the results of the studies in the light of fresh or updated data concerning hydroelectric resources, trends in the country's electricity needs, fuel price developments and other economic parameters, while bearing in mind the government's policy for utilizing domestic fuel resources and the potential existence of uranium in our country.

In a rapidly developing country like Venezuela, an extra margin of power generating capacity could be conducive to further industrial development.

Furthermore, if the basic and advanced training of specialized technical personnel is indispensable in developing a nuclear program, the best way to acquire and consolidate know-how and experience in the nuclear field would logically be to conduct studies on and construct an initial powerplant.

In light of all these considerations, in building an initial unit we would select an industrially proven plant model of ideal size, without aiming at maximum unit power, which might not be optimum.

The most economical management of energy resources is a difficult task given the inflationary outlook for the world economy and its uncertain future.

The ever increasing value of exportable fuels such as oil and coal could enable exporting nations to lay the groundwork so that they can meet their mounting energy needs of the future by prudently utilizing the funds from these fuel exports.

The preceeding remarks demonstrate the major challenge posed by the implementation of a nuclear powerplant program.

The industrialized countries can certainly provide a great deal of assistance to developing countries to meet this challenge. Nevertheless, this challenge will demand major efforts of the countries involved in terms of manpower training, raising capital and scientific and industrial development.

But thanks to these efforts, these countries will be able to build a future with greater [sentence ends]. Moreover, they will benefit from the indirect advantages of nuclear development, in particular, boosting the scientific and technological level of the individuals involved in the program and enhancing the skills of the technical personnel in numerous branches of national industry.

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BELGIUM

MOL CENTER SELECTS CAMPINE FOR NUCLEAR WASTE DISPOSAL

Brussels LE SOIR in French 8, 9 Oct 80 p 2

[Article by G. Dt.]

[8 Oct 80, p 2]

[Text] Last Friday at Mol in Campine a hole, an ordinary hole, attracted a crowed of nearly 150 people: parliamentarians from all the parties, city officials, police and fire chiefs. The birth of this hole was quite an important event. This was the first phase of a lengthy process that could solve the problem of radioactive waste storage, the Achilles heel of the entire nuclear industry.

Officials at the Mol Nuclear Research Center wanted to show that the problem could be considered scientifically and that reasonable solutions could be found.

Of course, not everyone shares this optimism. The antinuclear forces are not giving up. The "hole visitors" were met by groups of hostile demonstrators, and on 25 October an international antinuclear demonstration will be held at Mol.

Like any industry, nuclear power plants produce wastes. But the problem is that their wastes are radioactive and thus highly dangerous to people. Even in normal operation, large quantities of slightly radioactive water and gases must be eliminated. But the main wastes to be removed are used fuels. This is a cocktail of over 200 chemically different elements. Their radioactivity, and thus their danger, varies greatly. Some remain radioactive for only a few minutes; they have a short life. Others are radioactive for several million years.

The type of storage will differ depending on the type of wastes.

In treating radioactive wastes, a distinction is made between slightly radioactive wastes with a short life and very highly radioactive wastes. The first are the largest in volume; it is estimated that between 1975 and 1990 Europe will have accumulated over 1 million cubic meters of these wastes. The problem here is essentially a problem of finding an area which can house these wastes until they become harmless.

These wastes are mixed with either concrete or bitumen. Their final storage area is still very often the sea. Once a year, under the supervision of the Mol Nuclear Center and a number of international institutions, a boat dumps several drums containing slightly radioactive wastes from the Belgian power plants into the sea. This is all quite legal and conducted under supervision, but environmentalists and some scientists regularly protest against this way of using the sea as a "nuclear dump." The long term consequences of this dumping are not well known, they claim.

But the sword of Damocles suspended over the nuclear industry really concerns the treatment and storage of highly radioactive wastes. In Sweden, for example, no new power plants can be built if a reasonable solution to this problem isn't found. Fortunately, the volume of these wastes is small. By 1990 Europe will have accumulated some 20,000 cubic meters.

Vitrifying Dangerous Wastes

Then what can be done with these poisons for hundreds of thousands of years? How can we be sure that our descendants will not receive a fatal inheritance?

The proposal most often made is to bury wastes in the ground under certain quite specific conditions. Used fuel reprocessing plants could separate the still usable fuels (uranium and plutonium), the highly radioactive wastes, and the rest.

The most dangerous wastes would then be mixed and trapped in glass which is highly resistant to corrosion. This is the vitrification method. There is an experimental vitrification plant in France at Marcoule. The Mol Nuclear Center is also planning to acquire this type of facility.

But all this is still experimental and it will be some years before the preindustrial vitrification phase is reached in France. There are still many problems that have to be worked out.

These wastes, trapped in glass blocs, continue to produce intense heat. They have to be stored and cooled on the surface in bunkers, while being protected from any accidents. After 50 years of temporary storage, when the wastes no longer exceed a temperature of 100 degrees, then thought can be given to their final storage.

Doing Atomic Cooking for the Belgians

Used fuel from the present Belgian nuclear power plants is first cooled in pools inside the plants for 2 years. Then it is sent to the reprocessing plant at La Hague, France. The French then do the "atomic cooking" which separates wastes from the still usable fuel. And toward 1990, they will send it all back to us.

The wastes will then be stored in Belgium in bunkers which will most likely be located near Mol. Only at the beginning of the 21st century will the problem of their final storage have to be confronted.

Faced with the complexity and importance of this issue, though, preparations have to be started now to solve the problem of final storage.

The entire sequence of the fuel cycle could become an issue at the time of the parliamentary debate on nuclear energy. Several phases of the cycle are actually quite controversial and are considered dangerous. As an example, take the reprocessing plant which separates plutonium from the other wastes. Robbery and theft could enable terrorists or foreign countries to get hold of this plutonium and use it to make an atom bomb. The United States is strongly opposed to reprocessing plants. The European concept of the fuel cycle, though, makes the reprocessing plant an essential element of the cycle, making possible the recovery of a valuable fuel that "it would be a shame to throw out," as the Europeans say.

While waiting for this parliamentary debate, which has been pending for a long time, the Mol specialists are continuing to work. That is what we will look at in the next article.

[9 Oct 80, p 2]

[Text] Our nuclear generation is preparing a troublesome inheritance for the generations to come. Radioactive wastes from power plants will present a potential risk for thousands of years. Safe, final storage of these nuclear wastes requires a highly resistant "trash can." The Mol Nuclear Center is seriously studying the possibility of storing wastes in the subsoil of Campine. It invited parliamentarians, city officials, and everyone concerned to come look at the first step toward this storage facility: a hole.

Final and safe storage throughout eternity is impossible. The aim is rather to bury wastes until the time when their radioactivity will have diminished through a natural process, and they will not be very dangerous. Thought has been given to developing a safe storage facility to last for several thousand years, by the process of superimposing a series of barriers between the wastes and man. After that, no one knows exactly what will happen.

The first barrier is the glass shield surrounding the wastes. This protects them from corrosion. These blocs are then placed inside a metal container which is the second barrier. The entire thing is then buried deep in an appropriate geological layer: the third barrier. And finally, the column of earth separating the top of the geological formation from the surface of the soil forms the final protection. All these barriers should impede the movement of wastes toward the upper layer of the soil for thousands of years.

The major barrier is the deep geological layer. A "good layer" has to be deep so as not to be disturbed by surface events (a depth of 220 meters at Mol). It has to be thick enough and very stable from the point of view of earthquakes and volcanoes. Above all, there must not be any circulation of water, which could quickly carry the wastes back to the surface. Finally, the nuclear cemetery will heat this layer and so it must be resistant to this thermal action.

Salt or Clay

Germany and the Netherlands are studying the possibility of storing wastes in old salt mines. France and Great Britain, in granite. Belgium and Italy, in clay.

Under the Mol Center, at a depth of 160 meters and in a layer over 100 meters thick is the Boom clay formation. This formation apparently has no underground water circulation and for thousands of years the region has been stable both seismologically and volcanically. So it would be quite suitable for waste storage.

Many laboratory studies have been done: selection of metal alloys to be used to manufacture containers capable of resisting corrosion for several centuries. Metals heated to 100 degrees by the radioactivity of the wastes will be attacked by clay and steam, subjected to compression, stresses, etc.

Also studied was the filtering power of the clay. Imagining that the glass and the container no longer exist, how much time would it take for the wastes to break through the clay layer? This dispersion is very slow. It would theoretically take nearly 100,000 years for the clay layer to begin to be traversed. Moreover, some clay compounds have a chemical affinity for the wastes and fix them. This further slows down the dispersion of radioactive wastes.

In theory, then, effective storage in this clay layer is possible, but in practical terms, how will the clay behave at a depth of 220 meters when it is subjected to the heat produced by the radioactive wastes and to radiation? And when the clay layer is pierced by tunnels and galleries? Won't there be faults or breaks which might let the wastes seep out more rapidly?

A Laboratory in the Subsoil

To study all this, a laboratory will be installed right inside the clay layer. A well 220 meters in depth will be constructed. The parliamentarians were invited to view its start. It should be ready by the end of 1982. Experiments will then be conducted until 1987. They will study the mechanical, physical, and chemical behavior of the clay layer, as well as its capability to retain wastes. Moreover, hydrological studies will draw up a map showing the circulation of underground water, in order to be sure that there is no water in the layer and no risk of polluting the underground water supplies. A report should be ready by 1987. Remember, the problem of final storage of nuclear fuels should not arise in Belgium before 2025.

This experiment conducted by the Mol Center will cost over 300 million francs; 50 percent of the cost will be financed by the European Community. A final storage site for ten nuclear plants would cost nearly 20 billion francs.

To dig in the sand and then the clay layer, the soil temperature has to be lowered to -20 degrees. This also avoids any water seepage in the well shaft. A powerful cooling facility forms a sort of bottle of ice in the soil at a depth of 250 meters, with a diameter of several meters. Then the ice is broken by a pick-hammer before a double layer of concrete is poured. Between the two layers, a skin of impermeable plastic is placed. Once the entire well and the underground laboratory are poured in the concrete, the soil is thawed; it is hoped that this will disturb the layer of clay as little as possible. Working in these conditions demands special technology which has been developed for the Mol experiment.

Volcanoes and Meteorites

Theoretical safety studies have been done to determine the probability of accidents due to this storage. An accident scenario is imagined; it can include the sudden upthrust of a volcano, a new glaciation, the fall of a meteorite, war, or the digging of a mine by people who might have "forgotten" the presence of this nuclear cemetery. Then all these accident scenarios are broken down into a series of operations. A probability is assigned to each of them. The sum of them all gives the probability that an accident may happen (this is the "tree of decay"[?] method). The results give a very low probability of accidents and negligible risks for the population.

There are many people opposed to this storage project. The Dutch are afraid that the wastes may spread to their country. Environmentalists ask this question: what will happen in 10,000 years?

There is no real answer to this question. The engineers only comment that the radioactivity of the wastes by that time will have declined to the level of the natural radioactivity found in uranium mines, and there have never been any dangerous consequences caused there.

On Friday the Mol engineers showed that the problem of wastes could be studied scientifically and that a reasonable solution could be found. But will people be willing to live for thousands of years on top of a radioactive cemetery? To the more or less unconscious fear of radioactivity there will be added the fear, just as much a visceral reaction, of the duration of radioactivity. Can anyone predict what will happen in the centuries to come?

Meetings like the one at Mol do in any case help to remove some of the drama from the question.

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BRIEFS

NUCLEAR FUEL--Imatran Voima [state power company] has almost completed the talks concerning the transport of the used fuel of the Loviisa-1 nuclear power station to the Soviet Union. The talks which have been conducted in Leningrad for the whole of last week have progressed so far that only some matters connected with the technical responsibility for the transport have not yet been agreed on, according to Imatran Voima. The agreement will be signed in the first half of next year. An agreement on the return of the used fuel was reached in principle with the Soviet Atomenergoeksport when the Loviisa nuclear plant was purchased. According to the plans, the first consignment of used fuel from Loviisa-1 will be transported by rail to the Soviet Union towards the end of next year. The nuclear waste transports of the Loviisa-2 plant, which is now becoming operative, will become of topical interest in 4 years' time, according to Imatran Voima. [Text] [Helsinki Domestic Service in Finnish 0800 GMT 20 Oct 80 LD]

CSO: 5100

PVDA'S VAN DER STOEL WARNS OF SPREAD OF NUCLEAR WEAPONS

Rotterdam NRC HANDELSBLAD in Dutch 20 Sep 80 p 3

[Text] The danger of further proliferation of nuclear weapons is growing because of the unscrupulous attitude of some Western countries which sell nuclear technology. In these countries commercial considerations have priority over safety considerations. This badly hampers attempts to arrive at the best possible international nonproliferation policy.

This criticism came from chamber member M. van der Stoel (PvdA) at yesterday's meeting of the Dutch Institute for Peace Problems, dedicated to the test conference in Geneva which closed in the beginning of September. At this conference the countries belonging to the nonproliferation treaty (NPV) took for the second time a critical look at the operations and results of the treaty. The conference could not agree on a unanimous closing document, admittedly a serious setback in the battle against proliferation.

To prove that countries which nominally support the NPV are sometimes also doing things which seriously undermine this treaty Van der Stoel exposed a number of dubious nuclear contracts signed over the past few years.

In all these cases the buyers gained, as a result of the contracts, nuclear technology and/or materials which can be used for military purposes without adequate safeguards to prevent abuse.

Iraq

France, for instance, recently closed a deal with Iraq covering the sale of an experimental reactor fueled by highly enriched uranium. However, just like plutonium, highly enriched uranium can be used as raw material for a nuclear weapon. Although Iraq became an NPV member which puts its nuclear activities officially under the supervision of the International Atom Bureau (IAEA), the attitude of the present Iraqi Government is in this respect definitely unmistakable.

Van der Stoel also criticized the sale by Germany and Switzerland of a heavy water reactor to Argentina (not an NPV member) and Germany's contract of the early 1970's to build for Brazil (also not an NPV member) an enriching plant.

The ex-minister found the negative attitude of Germany and France in the so-called London Club of Nuclear Technology a blow to the policy of nonproliferation.

This club (the Netherlands is also a member) tried in the years 1975, 1976 and 1977 to arrive at a commonly accepted proliferation-proof export policy. One of its essential factors--the condition of total and complete control over all nuclear activities in the purchasing country (full scope safeguards)--was then thwarted by German and French opposition.

Threshold Countries

Van der Stoel stated that the number of "threshold countries"--countries which are on the threshold or have completely passed the threshold to become nuclear powers--apparently threatens to grow. In this respect he mentioned Taiwan, Iraq and Libya. Although the last two countries are NPV members (but not Taiwan), the background of their nuclear ambitions lacks the necessary clarity. The present six threshold countries are Israel, South Africa, India, Pakistan, Argentina and Brazil.

The Netherlands was also criticized by Van der Stoel because a Pakistani nuclear scientist succeeded several years ago in absconding unhampered with essential data on enriching uranium. Important parts of an installation to enrich uranium were also exported out of our country without a permit which should definitely not have been granted, according to the socialist chamber member. In conclusion he also criticized the uncooperative attitude of Euratom as regards (compulsory) control by the Vienna Atom Bureau over nuclear installations in the European Community. According to him, it has systematically undermined such control.

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CDA: NUCLEAR COMMISSION TO INSPECT NUCLEAR WASTE CONTRACT

Rotterdam NRC HANDELSBLAD in Dutch 3 Oct 80 p 1

> [Text] The Hague, 3 Oct--The CDA [Christian Democratic Appeal] Second Chamber delegation demands, in imitation of the opposition, that Minister Van Aardenne (Economic Affairs) permit the members of the Standing Chamber Committee for Nuclear Power to inspect the complete contracts for the processing of radioactive wastes from the nuclear power plants at Borssele and Dodewaard.

CDA Chamber Member Dr H. Eversdijk found that last year members of the FRG Bundestag were granted complete inspection of similar contracts to the ones concluded by the Provincial Zeeland Energy Company (PZEM) with the French concern COGEMA and by GKN (Dodewaard) with the British firm British Nuclear Fuels Limited. Eversdijk feels it is "foolhardy" that Dutch parliament members who will shortly have to give their decision on the treaty which ratifies these contracts have to deal with summaries.

The CDA member feels that Chamber Members "cannot sign any blank check." According to Eversdijk, inspection of the whole contracts--long demanded by the PvdA [Labor Party], D'66 [Democrats of 1966] and PPR [Political Party of the Radicals]--is all the more desirable now that more and more new "revelations" have been made recently about this agreement between PZEM and Cogema.

For instance, the VARA [Workers' Amateur Radio Association (The PvdA radio organ)] "Behind the News" recently maintained that this contract contains a stiff penalty clause in the event that Borssele does not want to take the in part highly radioactive wastes back from France after 1990. Despite denials by PZEM, there remain doubts on this point--but not only on this point--about the desirability of the contract, even among the members of the Chamber Committee for Nuclear Energy.

Eversdijk says that openness ("that is not the same thing as publicity") will in no way violate the agreement with France about keeping the contract secret. Minister Van Aardenne has always stubbornly refused to turn the entire contract over to the Chamber, referring to that agreement.

According to Eversdijk, nothing will be found in the confidential portions, including the so-called "side letters" (special stipulations), which would stand in the way of approval by the Chamber.

His attempt comes at a very late stage: all of the verbal and written preparations for the legislative proposal involved have in fact already been made.

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NETHERLANDS

BRIEFS

POLL ON NUCLEAR POWER--Amsterdam, 16 October--Four out of 10 Dutchmen feel that the two nuclear power stations in this country should be closed down and that a large-scale shift to coal-fired power stations is necessary, according to the results of a public opinion poll, published today. The poll was conducted by the Nipo public opinion institute among 861 people with a view to the national demonstration to be held at the Dodewaard nuclear power station west of Nymegen on Sunday. Nipo said that 34 percent of the respondents want Holland's two nuclear power stations to continue operating but felt that no additional stations should be built. They said that any additional power stations should be coal-fired. Fourteen per cent of those questioned said three more nuclear power stations should be built, while the use of coal should be limited. Eleven per cent did not have any preference for the solutions put to them by Nipo. [The Hague ALGEMEEN NEDERLANDS PERSBUREAU in English 16 Oct 80 p 5]

PZEM FINANCES PLANT REPAIR--Middelburg, 22 Sep--PZEM (the Provincial Zeeland Energy Company) has to have a condensor replaced in its nuclear power plant at Borssele for tens of millions of guilders. According to a PZEM spokesman, the replacement will take place early in 1982. During a triennial inspection early this year it was found that the steam generators in the power plant have been affected because the condensor is not watertight. The condensor cools the steam produced from other water by the steam generators. The steam drives a turbine which generates electricity. Because the condensor is not watertight and passes small quantities of harmful sea water, phosphates had been added to neutralize the sea water. It has now been found that the phosphates have affected the steam generators. According to the spokesman, further deterioration might lead to radioactive particles entering the sea water by way of the steam generators and the condensor. The new condensor will be made of titanium, which is even proof against sea water. According to the spokesman, titanium is always used in the construction of new nuclear power plants, but at the time that the Borssele plant was begun this material was too expensive. The board of directors of PZEM has already made credits available. These credits will be discussed further in the Zeeland Provincial Estates, which holds two-thirds of PZEM's stock, and at stockholders meeting. [Text] [Rotterdam NRC HANDELSBLAD in Dutch 22 Sep 80 p 3] 6940

CSO: 5100

BRIEFS

ESTIMATED URANIUM RESOURCES--As part of the International Uranium Resources Project, OECD (Organization for Economic Cooperation and Development) experts have completed an assignment in Portugal and have summarized their findings in a recently-published report in which they estimate uranium resources to be between 20,000 and 80,000 tons. [Text] [Paris REVUE GENERALE NUCLEAIRE in French Jul-Aug 80 p 363]

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